

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
6 October 2005 (06.10.2005)

PCT

(10) International Publication Number
WO 2005/091936 A3

(51) International Patent Classification:

G01N 30/28 (2006.01) G01M 3/16 (2006.01)
G01N 30/32 (2006.01) G01M 3/38 (2006.01)
G01N 21/00 (2006.01)

(21) International Application Number:

PCT/US2005/006719

(22) International Filing Date: 2 March 2005 (02.03.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/550,971 5 March 2004 (05.03.2004) US

(71) Applicant (for all designated States except US): **WATERS INVESTMENTS LIMITED** [US/US]; 109 Lukens Drive, New Castle, DE 19720 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **USOWICZ, James, E.** [US/US]; 4A Street, Douglas, MA 01516 (US). **BEALS, Peyton, C.** [US/US]; 90 Forestgrove Avenue, Wrentham, MA 02093 (US). **KEENE, Russell** [US/US]; 66 Beechwood Avenue, Sudbury, MA 01776 (US). **KENT, Richard** [US/US]; 7 Pheasant Hill Road, Norfolk, MA 02056 (US). **SOARES, Miguel** [US/US]; 11 Willis Drive, Norton, MA 02766 (US). **JOHN, Heden** [US/US]; 43 Proctor Hill Road, Hollis, NH 03049 (US).

(74) Agent: **JANIUK, Anthony, J.**; Waters Corporation, 34 Maple Street, Milford, MA 01757 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

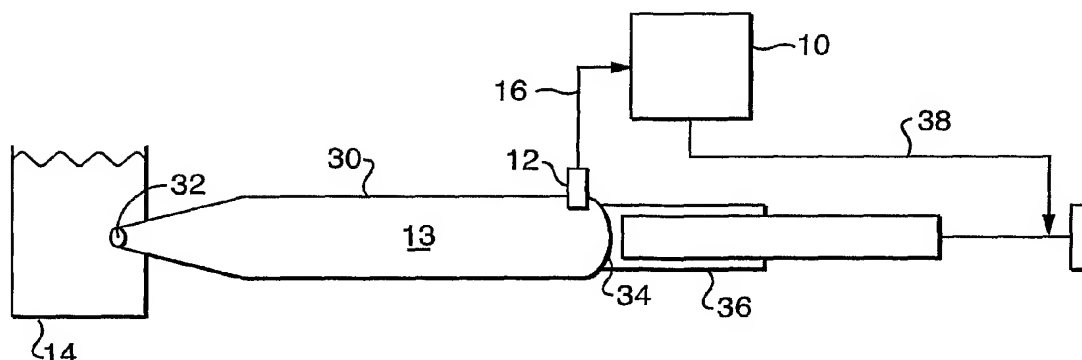
- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:

24 August 2006

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: HIGH PERFORMANCE LIQUID CHROMATOGRAPHY SAMPLE INTRODUCTION OPTIMIZED WITH BUBBLE DETECTION



(57) Abstract: A device (100) for detecting a condition in a fluid system (14) and initiating a response based on the condition. The device consists of a sensor (12) that responds to a first and second condition of the fluid (13) in the system and a control means (10) that receives the responses and generates command signals in based on the received response. In a liquid chromatography system, the device is used to determine the volume of components of the fluid system. In addition, the device allow leaks to be detected and permits the fluid in the system to be transported at a optimum speed. The device is well implemented utilizing to a light emitter and light receptor that are sensitive to the fluid in either a gaseous or liquid state.

WO 2005/091936 A3